New 360 Assembler Page 3

COMPUTERWORLD

The Newsweekly for the Computer Community

Weekly Newspaper – Second-class postage paid at Boston, Mass.

Standards & Disk Packs Page 2

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New B500 Has Modern Software, Peripherals

DETROIT, MICH. – Burroughs' entry into the low-cost market – in competition with IBM's 360/25, Honeywell's 110, the forthcoming NCR 615, etc. – came as a surprise. Burroughs did not respond to user needs by producing a completely up-to-date operation, but has instead put some of the 3500 system-memory units onto the well established but admittedly second-generation 300's. The result is a B500.

Already Available in Canada

The B500 has been sold, under the same name, in Canada and other foreign countries for some time. But only recently has it had a systems memory, consisting of a very fast small capacity disk unit. This allows an operating system and advanced compilers to be used with a tiny core area.

The success of the saving in core area is made apparent by the fact that, including storage areas, only 800 characters are used – and 320 of these are free for use as working storage. The Cobol compiler comes in 9.6K models and is available in larger 19.2K models.

Overlapping is restricted to slower peripherals – card reader, printer, etc. Overlapping is the ability of the computer to work at the same time as its peripherals. Cobol is available, provided the system memory is there, on the 9.6K core unit that rents for $1015 a month. The 19.2K unit, the only other size available, rents for $1215, and a minimum system with peripherals is about $3000 a month.

Deliveries Expected in '68

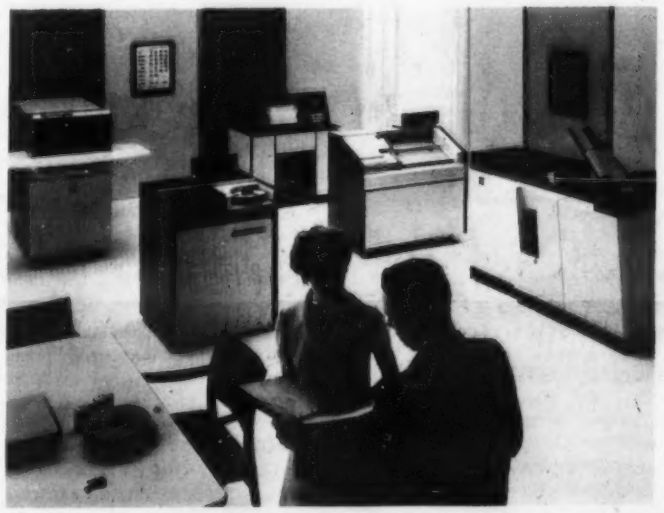
Multiprogramming is available, but is generally confined to cases where the buffered card and printer are being used primarily by one of the programs. The only new unit is the 315 line-per-minute printer. Most of the standard B300 peripherals can be connected to the computer.

Operating System

One of the basic concepts introduced is the use of an operating system at lower cost levels. Burroughs anticipated that a number of users would come to the B500 because it provides facilities of the B300 together with an operating system. It was felt that both Cobol and operating systems are needed for today's training.

The unit is compatible with the assembly language of the standard B100, B200, and B300, and to a large extent with the B500 series Cobols.

No demonstrations of the new system are presently being made, but customer deliveries are expected in the fourth quarter of 1968.



The Burroughs low-cost small system shown here uses third-generation peripherals and software grafted onto a second-generation processor so as to obtain the low price needed by the marketplace. The cluster tape unit in the foreground has recently been sent to a user's site for the first time – and reports are that it is performing well.

Nationwide Net

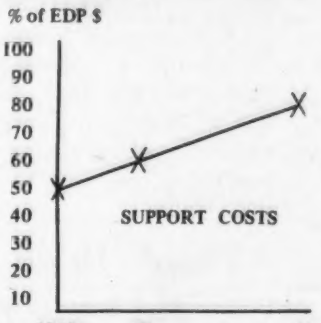
Now Its Univac's Turn To Offer 1108 Services

NEW YORK, N.Y. – Univac entered the time sharing race this week with their large scale 1108s matched with 418s. The network is already partially in operation and is planned to be completed within 1968 – with Univac 1004 card processors and DCT 2000s being placed in customers' offices. Branch offices of Univac and computer centers will use 9300s, which are considerably more powerful than the 1004s or DCT 2000s. "Facility sharing" is expected to be used to reduce the overhead cost. The division will run under an information services division which is being set up in Philadelphia.

Wider User Services

The services to be provided include making computing facilities available to users, designing, programming, and processing specific data processing applications and installing and managing complete information systems for clients. This appears to be a different style of operation than that presently being offered by computer manufacturers. Under the new system the hardware and even the software provided with the system are only part of the operational responsibilities to be taken on by the Univac division.

The reason for the additional emphasis being placed on supporting services was explained by Mr. F. A. Rowe, general manager of the new division, with a graphical illustration of the apparent increasing importance in services and support. His point was that users who are presently spending most of their dollars on hardware, will shortly be spending only 20% of it there. (See figure)



The increasing proportion of users costs involved with support – according to Univac's F.A. Rowe.

The facility sharing technique was described by Univac as allowing a customer to have the entire 1108 system exclusively for small time slices without overhead problems usually associated with time sharing. A special terminal access system called "Director" is designed to minimize the 1108 time used in the processing.

Small Business the Target

Small businesses appear to be a major target for the new service. Univac believes they can derive the benefits of large scale computers and overcome many of the difficulties presently had by small businesses getting into straight competition with some of the large firms who have in-house computer facilities.

Competition

The new Univac effort will be competing with a number of other networks run by other computer manufacturers. In recent weeks 1108 networks have been announced by University Computing Corporation and Computer Sciences Corporation, while both RCA and G.E. have nationwide networks planned.

EDP Students Changing Plans

EDP firms could lose most of their men under age 26 as a result of the new Selective Service ruling. The draft will also take nearly all of the new college graduates, leaving few left for industry or graduate schools.

According to the new ruling, occupational deferments will be harder to get, and there will be almost no graduate school deferments for people now in the fourth year of undergraduate school or first year of graduate school.

Deferments Still Possible

Local draft boards will still be able to grant occupational deferments "based on a showing of essential community need," but the National Security Council's list of critical occupations has been suspended.

About half of the 339,474 occupational deferments are based on the discretionary power of local boards, the other half on the list of critical occupations. It is not clear how many local boards will continue to use their discretionary power to defer systems and programs people employed by def[illegible]contractors. Even if they c[illegible]nue [illegible]sting occupational defer[illegible] t[illegible] will probably give out very few new ones, which will keep new college graduates out of the market until after they get back from Viet Nam.

Hiring practices are sure to be effected. Previously, draft eligible men migrated to the defense contractors, where they were likely to be deferred. Now, they will probably go to the large companies, like IBM, so that they will be assured of a job when they get out of the army. On the other hand, small companies like the new software houses, will be unlikely to hire anyone who is likely to be drafted.

The Lame, Halt, and Blind

The effect on graduate schools is likely to be severe. One university president said that next year's graduate classes will be limited to "the lame, the halt, the blind, and the female."

The elimination of graduate school deferments will hit particularly hard at the new computer science programs as well as mathematics graduate programs – they may find themselves virtually without students. This means there will be few people entering the computer industry with advanced degrees for the next several years.

Last year only 14,000 four-year college graduates were drafted. But since the order of call-up – oldest first – is unchanged, it is expected that nearly all of the more than 200,000 men to be drafted during the fiscal year 1969 (beginning July 1) will be from this group. There are currently 350,000 fourth year college men and 144,000 first year graduate students, nearly all of whom will lose their student deferments.

Resistance Increasing

Another possible effect may be increased resistance to the draft. Last

(continued on page 7)

PDP Programs Debugged On SDS System In Time-Shared Mode

ANN ARBOR, MICH. – The hour long assembly that takes up the whole of some PDP8 systems, is being handled here on a completely different computer in about 10 minutes. Moreover, the PDP8 programmer concerned continues to get the same feeling of having complete control of the system. This is true even though – for economic reasons – he is actually using a time-shared SDS 940.

There is not a close relationship between the two systems. The simulator is, like all simulators of different systems, much slower than the PDP8 itself – between 1/10 and 1/30 as fast. The advantage it has is the ability for quickly loading simulated PDP8 memory from disk storage – rather than the slower paper tape process used by many PDP installations.

Ed Duffenback of Com-Share, Inc., developed the system while waiting for a PDP8. He told COMPUTERWORLD that he not only successfully trained his programmers in its use, but during the working of programs, he often found them using the SDS system in preference to the PDP8 itself. "The time involved, from the programmer's point of view, definitely helps him to debug quickly," he said. Programs are written in the standard languages of PDP computers. Once a program has been debugged, it can be punched out on paper tape from the SDS 940 for direct loading into the PDP computer.

The system is not too expensive. Average charge to the user is $20 per hour of connect time – the average length of assembly is about 10 minutes on a time sharing system. Thus, the assembly on the SDS 940 costs the user approximately $3.

Com-Share has made the PDP8 simulator available from its Detroit, Chicago, Houston, and New York centers. User experience is still small and somewhat experimental.

Editorials

The Situation Is Serious

As this is being written, artillery and mortars are being directed against most of the cities of South Viet Nam. The second wave of fighting in cities that form base camps for the Americans is a serious situation in every respect. And, news reports underline the meaning of the Washington announcements concerning the draft.

The elimination of the critical industry classification, and most of the graduate deferments naturally hits hard at many young members of the computer community. In no way, however, are they being victimized. It also hits hard on the computer sciences graduate courses that are only now coming into their own. It may, in many cases, even cause their temporary elimination. This is a regrettable course of action, but the situation is serious.

People Don't Like Dentists- Do They Like You?

Little is more enduring than the unreasonableness of man. Reason may temporarily convince, persuade, or even change the course of history in a sudden swoop, but the opposite -- though defeated time and time again -- still rears its ugly head and continues to confound the best laid plans of reasonable men.

The dental profession still has to put up with comments such as, "I don't think anyone could like a dentist, except perhaps his wife and I'm not certain about her." Despite a century of progress in painkillers and the improved skills of practitioners, a visit to the dentist's chair still evokes the panic reactions of unreasoned fear.

We have seen the reaction of man to the black-box of computers, and have seen the failures of reasonable man to explain away the instinctive fear/hate relationship.

Good systems can be created even when this basically undesirable relationship exists. It makes things difficult -- but not impossible. We can do it -- and we should do it!

We should realize that we have to live with it and build our systems around it -- unless we want to be half hated/half feared like the dentists.

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The Newsweekly for the Computer Community

TM Reg. U.S. Pat. Off.

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The Standards Question — & Users

Is Lack Of Standardization Costing Disk Users Both Money & Capacity?

The problem of disk packs, and how much information you can store on them, does not appear to be related to standards. However, standards, or their lack, may be costing you 33% of your disk pack capacity. This is naturally important to you in terms of dollars, but is perhaps even more important in terms of systems.

The main point of a disk system, as with any direct access system, is that it has a definite, fixed capacity. Tape systems are different. If your tape files grow you can just add another tape, but with disk systems you have to install another disk drive.

Conversion from a one-disk to a two-disk system can involve some six to ten months waiting for the drive, and quite a lot of reprogramming. This is a far cry from waiting four minutes while your tapes rewind. This difference makes the capacity unit of the disk very, very important. In fact, anything that affects disk capacity is important, and worthy of standardization consideration.

The Adlogic Unit

Potter Corp. recently announced their Adlogic unit. This was to increase capacity of disk drives by 33% immediately, and later by greater amounts. It was designed to sit between the controller and the drive itself. The unit was not experimental – having been used for some time on other Potter equipment – but was being made available for all phase encoded devices (which includes all present day removable disk packs).

The selection of phase encoding was important. In fact, this was where the additional data was to be obtained. Phase encoding uses two flux changes to store one bit of information. It can be regarded as being a system with 100% redundancy. Whether or not such redundancy is really necessary is not known, and Potter obviously felt that it was not. A different coding scheme was developed and with only six changes they stored four bits. This meant that in six flux changes, currently used to store three characters, they could store four. Here was the 33% improvement.

Needs Controller Changes

The Adlogic unit was to be a simple plug-for-plug system insertion between controller and disk drive. Unfortunately, the data transfer rate range of the controller remains unknown to users (but only because they do not demand specifications from the manufacturer). As it turns out, the Adlogic unit requires the changing of a clock card in the controller to increase the speed of controller/Adlogic input/output. The controller, of course, was not to be supplied by Potter but by the hardware manufacturer. If you were to use the unit without controller clock card changes, you would be wasting approximately 33% of available disk storage.

The important matter here is the lack of controller specifications. The clock change for the Adlogic unit is not a very intricate operation – but the user must know whether or not his controller is all right as it stands or if it needs (and can accept) the clock timing change.

This kind of ignorance has lead to the effective withdrawal of the Adlogic unit from the market. It is currently available only on license. Users are also losing valuable disk pack capacity. Equipment specifications should be demanded. They are, after all, written to assist users, not restrict them.

This is one way that standards – or their lack – can effect you. If you wish to have your voice heard – use the coupon at the bottom of the page.

You'll Never Have One, So . . .

Why Bother About A 1901A?

Recently, COMPUTERWORLD received details on a computer that was not being marketed in the U.S. Believing, as we do, that much information passes through computer channels that has no immediate importance to a data processing manager, we started to file it in the appropriate waste paper basket. Before hitting bottom, a nagging doubt came up. Could it be that there *was* some importance to this announcement? Could it be that harried, overloaded, data processing managers should be interested in computers they will never have in their shop?

We decided to contact the manufacturer's Long Island office – International Computers and Tabulators of London. ICT is the fourth largest computer manufacturer in the world, having very extensive installations throughout Europe, Australia, New Zealand, and South Africa. ICT produces a wide range of systems, because of design needs and their history.

The British computer industry has recently experienced a number of mergers. ICT, primarily a commercial systems manufacturer, has taken over the large scale scientific computer operations of Ferranti Ltd. Their product line now stretches the full width of the IBM 360s.

In talking with the ICT American representatives we found that they have no immediate plans to market their computers in the U.S. However, they were of the opinion that it was important for many people in the U.S. to know of them. Their reason – the influence of America in the world.

"Many people, when they are buying a computer, look for advice, and sometimes consent, to their American colleagues. Even though they are not necessarily bound by the advice, they look at least for guidance, and in asking for this, they often presume that American headquarters are familiar with the range of computers that are being offered outside America," said James Ward, ICT's American market liaison officer. "We are here in America specifically so as to help American companies who have computers overseas. We are not selling from here, but what we are doing is making certain that the data processing manager, when called on to give advice, has available the necessary data and background.

This seems like an interesting idea, but the number of ICT computers is very large. To file details on all of them would be an enormous task, and the prospect seems uninviting. So, we asked Ward which of the ICT systems would, in reality, require this support.

His response was, "Look at the low end of the systems. When a user is big enough to buy a medium scale system, he has the expertise to be able to decide for himself, and he has the ability to talk clearly with his American counterparts. But, the smaller user who is buying for the first time is not in this position. He does not have the sophistication and relies heavily on American guidance. And, these first systems are generally small."

The American manager should realize that there are systems not generally offered to him. The new 1901A is probably the best example as it runs on the same level as the 360/25.

COMPUTERWORLD will cover this system next week. The 1901A may be important to you in your next job, if not in your present one!

Standards: Let Your Voice Be Heard Effectively

Congressman Brooks has asked the computer community to rethink basic standardization problems (See CW Vol. 2, No. 6, p. 2), and Dr. H. Grosch has agreed to review all comments and suggestions from COMPUTERWORLD users.

This is YOUR opportunity. Use the coupon below to send us your comments. They will not be ignored!

To The Editor, COMPUTERWORLD, 129 Mt. Auburn St., Cambridge, Mass. 02138

I am enclosing, on a separate sheet, comments for the consideration of Dr. H. Grosch, director, the National Bureau of Standards Center for Computing Sciences.*

These are relevant to:

- ☐ Brooks' letter, Point 1 – "There is a need for specific problem definition in the data processing standardization effort."
- ☐ Brooks' letter, Point 2 – "The standardization effort must be altered to optimize results."
- ☐ Brooks' letter, Point 3 – "Independent criteria identifying the characteristics of a new generation common computing language must be developed."
- ☐ Other.

See COMPUTERWORLD Vol. 2, No. 6, p. 2 or Communications of the ACM Vol. II, No. I, p. 55 for the text of Congressman Brooks' letter to Charles L. Schultze, director, Bureau of the Budget.

Name _____ Title _____

Company or Organization _____ Address _____

I do ☐ do not ☐ wish you to consider these comments for publication in CW.

*Copies of your comments will be forwarded to Congressman Brooks by COMPUTERWORLD.

Salvaged Magnetic Tapes Claimed To Have 'New Quality Assurance'

CORONA, N.Y. – Man-hour and dollar savings are claimed for a new unit that allows consolidation of magnetic tape using a thermo-fusion principle. The new TF4550 Consolidator permits re-writing and reading over thermo-fused tape areas on tapes including 800 bpi, 9-channel systems without significant signal drop, according to Prestoseal Manufacturing Corp., which introduced the unit.

The system is capable of salvaging and consolidating mini-rolls of tape into full 2400 feet reels with new tape quality assurance. It can create endless loops without signal loss and virtually eliminate expensive tape regeneration. The system can be easily incorporated into the user's magnetic tape cleaning and certifying system. The company claims it is simple to use without special training.

A descriptive brochure is available from Prestoseal Manufacturing Corp.

Human Engineering

USAF Wants 100K System, 4 CRTs

HANSCOM FIELD, MASS. – The Air Force Systems Command's Electronic Systems Division has invited 32 computer manufacturers to submit proposals on the installation of equipment at the Aerospace Medical Research Laboratories, Wright-Patterson AFB, Ohio. The equipment will be installed at the Human Engineering Division, and will be used to simulate man/machine system behavior.

The equipment will consist of 100,000-plus characters of central memory, four each CRT display stations, a low speed printer, a paper tape punch, tape drive, and immediate access storage units.

A live test demonstration of proposed equipment will be conducted on each vendor's equipment.

New Fortran H Needs Only 150K, Averages 30% Faster Compiling

WHITE PLAINS, N.Y. – The latest version of OS/360 includes the following Fortran H Version II improvements. Reduced Storage Requirements – The minimum storage is reduced to 150K bytes. A 200-300 source card program can be compiled in a 150K partition. For larger programs, Version II requires approximately 18K bytes of internal storage per 100 source cards, instead of the 35K required by Version I. Improved Compile Time – In a test group of 15 programs, IBM reports that Fortran H Version II compile time reductions averaged approximately 30 percent compared with Version I. Direct Access Statements – Version II permits the random reading and writing of fixed length records from or onto direct access devices. Additional Debugging Facility – A user-controlled option provides separate listings for each source symbol and source label, and includes the internal sequence numbers of the reference source statement.

Also included are provisions for support of the Binary Synchronous Communications adapter of the IBM 2701 and 2703.

OK, We've Got The Tape, Now Let's Find A Use For It

HUNTLEY, ILL. – The U.S. Magnetic Tape Co. became the first computer tape manufacturer to conform successfully with federal standard requirements for computer tapes that can be used for critical applications. The importance of this is not clear – as of now there have been no demands for such a tape! General Services Administration explains that possible applications are in aerospace, seismography, and other areas in which there is only a single chance to record the data.

The tape which passed the critical specifications was Duramil 7. The standard (which is a provisional one) calls for less than one error in every 30 reels – quite different from the standard for non-critical applications that allows up to 20 errors per 30 reels. Tests were completed in late 196[illegible] under the General Services Administration.

A New Assembler For 360s Simplifies & Corrects Coding

PALO ALTO, CALIF. – When Niklaus Wirth, a Stanford University faculty member presently working in Switzerland, was faced with programming the university's 360 in machine language two years ago, he reacted so strongly to the manufacturer-provided assembly language that in place of it, he wrote a completely new language for the computer!

Details of his language show that he successfully replaced 75 of the standard 360 sections with just four of his own. In addition he included the capability to find out what the programmer really meant when he wrote incorrect codes – and let the assembler improve its error-correcting performance as time goes along. Details of the system, aims, etc., were published in the Journal of the ACM this week, and show both what he did and why he felt it necessary to do.

BAL "Not Sufficiently Convenient"

Wirth originally decided to implement the successor to Algol on the 360 and felt that the 360 assembly language would not be able to meet desired documentation standards, or constitute a sufficiently convenient programming tool. Among his objections to the present standard language are the 360 addressing problem – which he regards as complicated and full of pitfalls – and to some "architectural misfits," that he lists.

Primarily, he felt that the language was simply not a good programming tool. In discussing this he points to the question, "How well

(continued on page 7)

How PL360 Reduces the Number of Assembler Instructions Needed

Operands		1	2	3	4	5	6	7	8	9
Register	*Primary*	:=	+	–	*	/	++	––	:=	*p*
Integer register	Integer register	LR	AR	SR	MR	DR	ALR	SLR		CR
Integer register	Integer cell	L	A	S	M	D	AL	SL	ST	C
Integer register	Short integer cell	LH	AH	SH	MH				STH	CH
Real register	Real register	LER	AER	SER	MER	DER	AUR	SUR		CER
Real register	Real cell	LE	AE	SE	ME	DE	AU	SU	STE	CE
Long real register	Real register	LER	AER	SER	MER	DER	AUR	SUR		CER
Long real register	Long real register	LDR	ADR	SDR	MDR	DDR	AWR	SWR		CDR
Long real register	Real cell	LE	AE	SE	ME	DE	AU	SU	STE	CE
Long real register	Long real cell	LD	AD	SD	MD	DD	AW	SW	STD	CD

All of the nine or so standard 360 assembly instructions listed in a numbered column of this chart were replaced by one instruction in PL360. The assembler selects which particular machine instruction is needed by recognizing the types of operands concerned – the nine possibilities being listed in the first two columns. As there are standard mathematical operators for the arithmetic and logical operations, all the instructions in Columns 2 through 8 are actually replaced by one style of instruction – the columns being simply differentiated by the use of +, –, etc.

John Hopkins To Offer Doctorate

BALTIMORE, MD. – The Johns Hopkins University has begun offering a Ph.D. program in Computer Science.

A bachelor's or master's degree in mathematics, science or engineering is the normal prerequisite to the program, but applicants from other fields will also be accepted. Students can enter the program through the Departments of Mathematical Statistics, Engineering, Operations Research, or other cooperating departments.

The University's large computing facility includes IBM 360s, 7094s, and 1401s, Digital Equipment PDP-8s, an SDS Sigma 7, and a Honeywell 1200. Plans are in progress for the establishment of a large new system to cover the entire University.

Additional information on the Ph.D. program is available from Professor Martin Greenberger, Chairman, Committee on Computer Science, The Johns Hopkins University, Charles and 34th Sts., Baltimore, Md. 21218.

N/C Computer Priced Under $12K

PLAINVIEW, N.Y. – A low-cost general purpose computer designed for use with numerical control machine tools has been introduced by Potter Instrument. The new Model PC-9600 Picomm computer is priced at under $12,000. The system provides complete computer capability for N/C tape generation.

The system can also be used for contour generation, automatic "accept-reject" determination of inspected parts, and production of a complete record of deviation and tolerances.

The computer is available in 2K, 4K and 8K character memory sizes, and larger memories are available upon request. For additional information, contact: Measurement Systems Manager, Potter Instruments, East Bethpage Rd., Plainview, N.Y. 11803.

25% Keypunching Cut Hoped For

MILWAUKEE, WISC. – The Northwestern National Insurance Company is hoping to replace 25% of their keypunching volume with a Control Data 915 page reader that has just been installed, according to Linus Magee, assistant secretary and administrative systems manager.

Magee told COMPUTERWORLD this week that results obtained to date had not been fully checked out, but "we have the accounts receivable moved from punched cards onto a turn-around document," he said, "and we are hoping to replace much of the keypunching by using typist style input, and reading the document off on the page reader.

"There is a lot of keypunching around insurance companies and we hope to reduce it by 25%. However, we won't know the final results of the present operation for another two months, so it is a bit premature to start cheering yet."

The Milwaukee home office of the multiple-line fire and casualty insurance company is the data center for accounts handled in its 19 branches. Approximately 2900 agents' statements, and an average of 60,000 cash items, are handled monthly.

In the newly installed system, an optical scanner electronically reads turn-around cash tickets prepared in the branches. The 915, under the supervision of the computer, transfers this data directly to magnetic tape for input to the company's data processing system. The system was pretested in three branch offices prior to installation last month.

The 915 eliminates the account reconciliation sheets prepared in the home office accounts receivable department

Local Back-Up Key Item

Small CP To Power Citywide Info System

LAFAYETTE, LA. – Mayor J. Rayburn Bertrand of Lafayette announced this week that the city is to install one of the nation's most advanced computerized city information systems. Although the installation will be comparatively small – an IBM 360/30 – the claim appears to be a justified one. System planning began two years ago, and will not be completed until 1970.

James P. Begnaud, CDP, EDP center director, told COMPUTERWORLD this week that his center was very pleased with the way operations had gone to date, and anticipates being able to meet the unusually advanced operations being planned.

Frightened By Accuracy

"We are going to provide hard copy terminals in many of the divisions and are seriously considering providing visual terminals to certain specified city officials." he said. "Everything is going on schedule now. For a short time we were a bit behind in our programming, but now it is going so very precisely according to schedule that we are frightened of our accuracy!"

The system will start with 2311 disks, and move up to a 2314 multiple spindle unit. This is an unusually expensive peripheral for a 360/30, but, as Begnaud pointed out, "We are I/O limited. It really doesn't make sense to improve the speed of the central processor when we are using these disks so constantly."

Why Only A 360/30

The decision to use a 360/30 was made in 1966 when there were no competitive systems installed locally, and when IBM had much more disk-pack experience than any competitor available in the field.

Operations will take place under DOS and all programming is being written by city personnel. "We have refused to allow any programs to be written by the supplier. They may know about selling computers, but I think that we know our job better than they do," said Begnaud. Cobol is being used as the main language.

The Third Annual Interdisciplinary Symposium, entitled "Uses of the Computer for Basic Research in the Humanities and in the Behavioral Sciences," will be held May 2, 1968, at the Stevens Institute of Technology in Hoboken, N.J.

EDPeople

Disk Producer Names Sackter VP

Melvin Sackter, a pioneer in magnetic recording technology, has been named vice president and technical director of *Burton Magnekote, Inc.*, California specialists in substrate plating and finishing of metallic magnetic surfaces for computer and data storage memory disks and drums. Sackter has a 20 year background in magnetic recording.

Murphy

R.T. Murphy, director of electronic data processing for *Morse Shoe Co.*, Canton, Mass., has been appointed an assistant vice president of the company Murphy holds a DPMA Certificate in Data Processing. He is a member of the ACM and the board of directors of DPMA, Route 128 Chapter.

Rosen

S. B. Rosen has been named director, Systems Analysis Group, for *Technical Operations, Inc.*, Arlington, Va. The Systems Analysis Group is a new organization established by the pany's System Sciences Div.

Elbert Matthews has been named assistant to the president of *Computer Usage Development Corp.*, Mt. Kisco, N.Y.

Johnson

A.W. Johnson has been elected a vice president of *Dearborn Computer Corporation*, Chicago. Johnson, 27, was formerly associated with IBM as a marketing representative.

G. E. Smith has been appointed director, Southeast operations, for *Informatics Inc.*, Sherman Oaks, Calif. Smith will work out of Melbourne Beach, Fla.

Early Communitype Units Reduce Naval Keypunching

SAN DIEGO, CALIF. – It was revealed to COMPUTERWORLD this week that Communitype data communication systems have been in operation since last October at the U.S. Naval Electronics Laboratory. This system is specifically designed to reduce – or eliminate – the need for keypunching and using typists as operators.

However, they are not the standard Communitype units. They were ordered, as a matter of urgency, prior to the development of the present Communitype unit, which will have a considerably higher capacity for holding typewritten material on magnetic tape.

Fall Joint 'Call For Papers' Out

The Technical Program Committee for the 1968 Fall Joint Computer Conference has issued a call for papers. Contributions are being sought on all aspects of the state-of-the-art in hardware, software, systems and applications. The conference will be held in San Francisco, December 9-11.

Only new, unpublished papers will be considered. Five draft copies of full papers up to 7500 words and 100-150 word abstracts are due before May 12. Rough illustrations are also requested. They should be submitted to Technical Program Committee Chairman Robert H. Glaser, 1968 FJCC, P.O. Box 2309, Stanford, Calif. 94305.

Expansions

ITT Opens Network In Northeast

WALTHAM, MASS. – *ITT Data Services* began operations in the New England area with the opening of an EDP service center in Waltham. The new center is to be the nucleus of a large scale network to serve all of New England via data transmission lines, satellite centers, and remote terminals.

The new facility will be equipped with an IBM 360/30 and will be linked by high and low-speed data transmission lines to the company's Eastern Regional Center in Paramus, N.J., which will provide firms in the Boston area access to two IBM 360/65s. A 360/65 will be installed in the Waltham facility later this year.

NEW YORK, N.Y. – *National Computer Analysts, Inc.*, with headquarters in Princeton, N.J., has opened an international sales office at 500 Fifth Avenue, New York. Monroe J. Klein, vice president sales for the EDP service bureau, will manage the new office.

PALO ALTO, CALIF. – *Informatics Inc.* has opened a new field office at 260 Sheridan Ave., Palo Alto. The office will provide support to the activities of Western Divisions headquartered in Sherman Oaks. Wilson Cooper will manage the office and provide support for Informatics projects at the Ames Research Center and other projects located nearby.

CAMBRIDGE, MASS. – *Keydata Corp.*, a Cambridge-based time sharing facility furnishing on-line business data processing services, is expanding operations to scientific and engineering computing. David A. Magidson has been named account manager for this activity. The services will be offered on a Univac 1108 Multi-Processor system soon to be installed in Boston. Eventually, Keydata plans to provide users with on-line real-time data processing for scientific and engineering applications.

New Products

Teaching Kit For Fluidics Logic

A new self-contained portable unit for fluidic logic training, breadboarding and control purposes is available from *Pitney-Bowes Fluidics*, Stamford, Conn. Called the Flowboard Logi-Kit, the unit can serve as an easily programmed fluidic control unit and teaching aid for fluidics and logic. The Logi-Kit uses the firms Flowboard 22-amplifier fluidic unit, input sensors, output indicators, filter, connectors, tubing and a pressure guage. It can control machines and processes through such fluidic functions as memory, pulser, oscillators, counters, shift registers and timers. The unit develops enough power to supply as many as five additional Flowboards or auxiliary fluidic units such as electronic-to-fluidic transducers, a power stage amplifier, a fluidic numeric indicator and counter, and a fluidic ear.

Calendar

SEMINARS, WORKSHOPS:

Feb. 26, Boston – "File Structures for On-Line Systems." Contact: ACM, 211 E. 43 St., New York, N.Y. 10017.

Feb. 27, Philadelphia – "File Structures for On-Line Systems." Contact: ACM, 211 E. 43 St., New York, N.Y. 10017.

Feb. 26 - Mar. 1, Chicago – "Simscript, Modeling and Simulation." Contact: Southern Simulation Service, Inc., P.O. Box 1155, Tampa, Fla. 33601.

Feb. 29, Pittsburgh, Pa. – "Managing the Computer Center," Pittsburgh Hilton. Contact: ACM, 211 E. 43 St., New York, N.Y. 10017.

Mar. 11 - 15, Princeton, N.J. – "Interactive Analog Computation," EAI Computer Center. Contact Electronic Associates Inc., West Long Branch, N.J.

Mar. 13 - 15, Washington, D.C. – "Data Communications System Design." Contact: Registrar, University Computing Co., 1949 N. Stemmons Freeway, Dallas, Texas 75207.

CONFERENCES, SYMPOSIA:

Mar. 4 - 6, New York City – "New Perspectives on Management Information Systems," AMA's 14th Annual EDP Conference. Contact: American Management Association. AMA Bldg., 135 W. 50 St., New York, N.Y. 10020.

Mar. 5 - 7, Fort Monmouth, N.J. – Symposium and Planning Briefing for Industry on Aviation Electronics. Contact: Commanding General, U.S. Army Electronics Command, Attention: AMSEL-RD-LN Fort Monmouth, N.J. 07703.

Mar. 20 - 22, Los Angeles – "Critical Factors in Data Management, 1968: Problems and Solutions," Symposium sponsored by Informatics Inc. and UCLA. Contact: Engineering/Physical Engineering Extension, 6532 Boelter Hall, University of California, Los Angeles, Calif. 90024.

Apr. 3 - 5, Philadelphia – "N/C – Tomorrow's Technology Today," Numerical Control Society Fifth Annual Meeting and Technical Conference. Contact: Mary Ann Devries, NCS, 44 Nashua St., Princeton, N.J. 08540.

Apr. 30 - May 3, Atlantic City, N.J. – Spring Joint Computer Conference. Contact: AFIPS, 345 E. 47 St., New York, N.Y. 10017.

USER GROUP MEETINGS:

Mar. 12 - 15, Philadelphia – Joint Spring Conference of Univac Users Association and Univac Scientific Exchange. UUA Contact: George Popp, Harris Trust and Savings Bank, 111 W. Monroe St., Chicago, Ill. 60690. USE Contact: Harry Rayner, Univac, P.O. Box 8100, Philadelphia, Pa. 19101.

Mar. 25 - 27, Chicago – Third Annual Spring Meeting of Electronic Computing Hospital Oriented (ECHO), Pick-Congress Hotel. Contact: Richard A. Crenshaw, vice president, ECHO Hillcrest Medical Center, Tulsa, Okla. 74104.

New Software House

Two 1130 Programs Offered

NEW YORK, N.Y. -- Programming Sciences Corp., a new firm, has released two 1130 programs. One is a cross reference program for assembler language that comes under the disk monitor system, and is priced at $75. The other, a far more ambitious graphics access method for the 1130 with 2250s, is priced at $1900.

XREF System

The simple cross reference system, XREF, provides users with a table of all labels and data names used within a specific assembler language program, plus a listing of all sub-routine calls. These are particularly useful as standard IBM software does not have this facility. Debugging is greatly simplified when cross reference systems are used to run numerous checks on both specific reference symbols and symbols created by key punch errors.

XREF operates as a user program and resides on the 1130 disk in the user area. Input is the assembler source deck, and output the printer cross reference listing. Core storage of 8K and one disk unit are used.

Graphics Access

The graphics program, GRAM, is specifically designed to solve the intricate program problems of I/O display. GRAM has kept down core size so that core requirements will not hamper use -- the resident portion of GRAM occupies less than 1000 words. This allows for polling and direct entry handling of the 2250. GRAM will be available on disks by early March.

Data On The New B 500s

The B500's Cobol compiler, based in the systems memory disk file, lets a 9.2K user take advantage of this higher level job-oriented language. Cobol also provides the user with a direct route for growth into any of Burroughs' larger 500 systems, which according to Warren Curtis, Burroughs project manager, "is no less compatible with the Series 500 Cobol than any other Cobol."

The sort programs normally use the disk. No Fortran is included. Report and sort generators are available.

Program Library

An extensive group of field proven programs from the B-300 systems are available for many applications ranging from finance to public service and general industry. These include a comprehensive set of banking programs, government and public utility programs, and some inventory management programs.

Data conversion routines, sort program generators, and a large array of other proven programs, sub-routines and programming aids -- developed for or by B 100, B 200 and B 300 users -- are available for direct use with the B 500.

Operating Systems

Supervisory control programs and operating system control programs are available for magnetic tape and disk file versions of the B 500. These control both sequential processing and multiprogramming operation. Operating systems handle program loading, overlaying of program segments, monitoring and debugging, operator communications, peripheral unit control, and other functions.

Central Processor

The B 500's central processor has 9600 or 19,200 individually addressable characters of magnetic core main memory. Multiply/divide is standard. Buffering is provided for card and printer, but not for tape or disk operations.

Communications terminals and control units, separate from the processor, handle buffering, code translation, line discipline, error detection and correction.

Line Printers

One or two printers can be connected, each with operating speeds of 700 to 1040 lines per minute, and 120 or 132 print positions per line. Or, a new 315 line-per-minute model.

The card readers (one or two units) operate at 200, 800, or 1400 cards per minute. The card punch equipment operates at 100 or 300 cards per minute. The paper tape reader operates at 500 or 1000 characters per second, selectable by operator. There is a 100 character per second punch.

Systems Memory

The systems memory is a compact single disk head-per-track disk file. There are 2.4 million characters in 240 character segments. The average access time is 23 ms. It is required for Cobol use.

Disk File Sub Systems Available

Additional disk file sub systems are available with on-line storage in 9.6 million character modules up to a maximum of 480 million characters/720 million digits. They use head-per-track design, with average access of 20 ms. In addition, data memory banks are available in 19.2 million character modules with total capacity of 960 million characters/1.44 billion digits and 40 ms average access.

Data Communications

Data communications facilities include terminal units, line adapters, and remote inquiry stations including Burroughs Input and Display consoles and monitors, financial On-Line Teller Consoles, and satellite systems.

Magnetic Tape Units

The system uses free standing units with recording densities of 200, 556, and 800 characters per inch and data transfer rates of 18, 50, and 72KC. The multi-tape "clusters" with similar recording densities and transfer rates of 9, 25, or 36KC may also be used. Two to six tape stations can be connected per B 500 system.

Contents Of Govt Files Revealed

WASHINGTON, D.C. – Senator Edward Long (D-Mo.) has released a 605-page summary showing how much information the Federal government maintains on individual American citizens.

Long's report shows that names appear in government records almost three billion times. "Our age is recorded more than two billion times, marital status 1½ billion times, and our income more than 1¼ billion times," the Senator said. "To my knowledge, this is the first inventory showing the amount of government information on American citizens ever prepared."

Long said, "A careful reading of this report shows that there is very little that some agency of the Federal government does not know about us from the cradle on."

"Hearings before my Subcommittee have convinced me that whatever privacy remains for the American citizen, it remains because the Federal government is presently too inefficient to pull all its personal information files together," the Missouri Senator said. "Thank goodness it is now extremely time-consuming and expensive to put your finger on any one individual."

"But," he warned, "the proposed government computer or so-called federal data bank will make it easier and cheaper to put your whole life history no further than the push of a button away."

"We recognize that computer data banks are but another result of the fantastic technical progress our Nation has made in recent years. But, what good will all this progress be if we fail to preserve our privacy at the same time?"

The table shown gives the number of individual person-entries for some of the more standard categories – Name, Social Security number, etc. The numbers are given in thousands – so are rather bigger than they appear at first sight. The totals are given first, and are followed by a breakdown that depends on whether the data is or is not considered to be confidential. There are a number of different types of confidentiality, some of which have been described by Senator Long as being virtually worthless because of the large number of people who have access to the data. In this particular breakdown the confidentiality is divided according to the source of the restriction – whether it is confidential because some specific law says that it shall be, or because it was gathered under a pledge of secrecy.

Among the data held in the files are such items as credit ratings, debts, alcoholism or drug addiction, and even the reported condition of living quarters, as well as standard items such as references, police records, etc.

Particular agencies carry more specific items. The Bureau of International Commerce has a name card index of 192,000 people whose reported activities or reputations suggest that they are or might be "suspect" in relation to export and/or other applicable security controls. The Bureau of Public Roads has the names of drivers who have had their licenses revoked, and those who have expressed an interest in highway beautification. There are many more names in the "revoked licenses" file (900,000) than in the beautification file (2100).

Professional registers of patent attorneys are held by the Patent Office, while the Security Office of the National Bureau of Standards holds the names of visitors to their research associate guest workers. The fifteen consultants who perform duties with the Office of the Assistant Secretary of Defense (International Security Affairs) are included in appropriate folders – and they seem to be a fairly exclusive group, as only one consultant a year is added to the files. Not quite so exclusive are the ranks of the Principal Food Shoppers – all 1049 of them – who took part in the 1966 Survey of Consumer Knowledge Levels, and whose details are on file in the Bureau of Education and Voluntary Compliance. The files included in the inventory are only part of those included in what the layman considers to be the "Government." There are no listed files of information held by various committees and subcommittees of Congress or other legislative branches of the federal government.

TABLE 4–A.—*Type of information by number of files containing each type by confidentiality restriction and mandatory or compulsory basis of reporting*

Type of information in files (files are counted once for each type)	Total (includes nonresponse cases on confidentiality restriction)				Confidential by specific statute			
	Total	Data obtained under express or implied compulsion	Data obtained through voluntary cooperation of the respondent	Data required as a condition for an application, for participation in a program, for the award of a contract, etc., or basis of reporting unknown	Total	Data obtained under express or implied compulsion	Data obtained through voluntary cooperation of the respondent	Data required as a condition for an application, for participation in a program, for the award of a contract, etc., or basis of reporting unknown
Total	14,673	3,992	4,077	6,604	4,645	1,839	880	1,926
Name	1,664	454	455	755	437	180	86	171
Social security number	490	138	95	257	225	96	30	99
Age	1,025	251	340	434	281	99	66	116
Birthplace of parents	174	49	53	72	64	23	14	27
Marital status	669	187	212	270	226	91	50	85
Number of children	434	125	137	172	159	65	31	63
Race	413	129	180	104	141	60	50	31
Religious affiliation	129	44	50	35	45	21	11	13
Citizenship and national origin	548	135	123	290	152	57	29	66
Physical characteristics	362	87	117	158	89	32	21	36
Addresses, current and past	1,258	321	348	589	353	151	68	134
Military service	450	125	112	213	151	47	29	75
Military serial number	301	96	60	145	115	41	17	57
VA claim number	99	25	20	54	59	14	8	37
Welfare status and history	69	19	20	30	33	13	4	16
Income: total and/or by sources	424	158	101	165	174	90	21	63
Assets	66	18	13	35	60	26	5	29
Debts	56	20	12	24	39	13	6	20
Expenditures	46	10	23	13	34	9	5	20
Credit rating	40	14	8	18	9	2	7	0
Checking and savings accounts	30	9	9	12	16	5	4	7
Homeownership	50	6	31	13	17	7	5	5
Public housing occupancy	14	4	3	7	4	1	2	1
Mortgage delinquency history	11	7	4	0	2	1	1	0
Condition of living quarters	33	4	21	8	11	4	3	4
Highest grade completed or degree(s) earned	234	31	103	100	160	12	48	100
Grade average or class standing	54	10	16	28	22	2	10	10
Knowledge of foreign languages	81	18	24	39	57	6	16	35
Occupation: current and/or past	331	64	132	135	324	69	74	181
Employment status and history	232	41	79	112	169	29	44	96
Occupational licenses and certifications held	120	24	35	61	116	8	24	84
Employer	238	58	67	113	259	54	53	152
Recommendations and references	135	26	34	75	81	7	23	51
Police record	89	24	20	45	64	16	17	31
Security or other investigative reports	83	34	20	29	46	18	9	19
Involvement in civil or criminal court action	90	30	21	39	74	20	11	43
Medical history	187	34	96	57	50	7	16	27
Dental history	46	11	23	12	17	1	6	10
Psychiatric history	63	21	22	20	27	6	6	15
Personality inventory	52	18	21	13	13	3	3	7
Alcoholism or drug addiction	63	21	28	14	24	4	5	15
Food purchases and consumption	23	0	21	2	2	0	2	0
Consumer preferences	4	0	3	1	3	0	2	1

TABLE 4–B.— *Type of information by number of responses on each type by confidentiality restriction and mandatory or compulsory basis of reporting*

[In thousands. Detail may not add to total because of rounding.]

Type of information in files (responses are counted once for each type)	Total (includes nonresponse cases on confidentiality restriction)				Confidential by specific statute			
	Total	Data obtained under express or implied compulsion	Data obtained through voluntary cooperation of the respondent	Data required as a condition for an application, for participation in a program, for the award of a contract, etc., or basis of reporting unknown	Total	Data obtained under express or implied compulsion	Data obtained through voluntary cooperation of the respondent	Data required as a condition for an application, for participation in a program, for the award of a contract, etc., or basis of reporting unknown
Total	27,270,136	18,215,914	1,363,042	7,691,180	24,956,479	17,197,767	797,117	6,961,596
Name	2,926,280	2,153,648	132,288	640,344	2,644,326	2,002,040	81,630	560,657
Social security number	1,522,192	1,116,385	28,013	377,794	1,445,891	1,080,161	20,694	345,036
Age	2,061,110	1,481,178	117,378	462,554	1,866,905	1,375,097	77,700	414,107
Birthplace of parents	600,952	474,101	44,752	82,099	581,072	456,717	44,147	80,208
Marital status	1,593,881	1,190,061	81,628	322,192	1,510,912	1,155,599	61,057	294,356
Number of children	736,782	412,692	40,766	283,324	696,548	401,032	26,890	268,626
Race	1,571,168	1,385,909	94,326	90,933	1,462,157	1,322,958	67,609	71,590
Religious affiliation	150,914	61,413	18,118	71,383	110,172	48,901	6,504	54,768
Citizenship and national origin	1,156,782	843,304	67,954	245,523	1,064,551	806,223	49,903	208,424
Physical characteristics	501,237	292,319	42,555	166,363	379,069	214,638	14,655	149,776
Addresses, current and past	2,354,620	1,658,602	121,963	574,055	2,127,346	1,535,428	79,776	512,141
Military service	1,048,496	626,252	53,036	369,208	955,914	609,104	24,191	322,619
Military serial number	570,591	245,230	41,497	283,864	497,810	228,059	15,183	254,568
VA claim number	216,290	21,039	22,610	172,641	193,657	20,601	16,030	157,026
Welfare status and history	120,899	43,827	2,263	74,809	118,698	43,534	1,050	74,115
Income, total and/or by sources	1,253,697	1,010,005	13,142	230,550	1,207,698	1,002,469	4,187	201,042
Assets	249,676	173,520	3,249	72,907	231,296	169,030	2,123	60,142
Debts	247,769	163,956	3,227	80,586	234,336	162,098	2,103	70,135
Expenditures	139,809	63,047	3,263	73,499	127,494	62,222	2,269	63,003
Credit rating	69,648	4,990	371	64,288	68,587	4,493	8	64,087
Checking and savings accounts	190,942	119,571	1,683	69,683	189,190	118,617	1,199	69,373
Home ownership	981,385	919,329	3,526	58,531	977,367	918,431	2,390	56,546
Public housing occupancy	40,346	3,921	614	35,811	39,296	3,745	450	35,101
Mortgage delinquency history	53,610	4,393	217	49,000	52,843	3,843	0	49,000
Condition of living quarters	284,520	231,431	1,893	51,196	282,000	231,279	1,050	49,678
Highest grade completed or degree(s) earned	605,215	403,932	17,328	183,956	580,049	393,463	7,565	179,021
Grade average or class standing	169,545	57,948	6,631	104,966	151,408	48,282	0	103,126
Knowledge of foreign languages	189,517	60,441	7,129	121,946	170,598	50,638	39	119,922
Occupation, current and/or past	1,356,482	1,000,490	77,176	278,816	1,249,701	958,845	49,313	241,543
Employment status and history	1,071,864	820,756	34,417	215,691	1,030,634	808,801	13,487	208,347
Occupational licenses and certifications held	224,354	63,707	17,680	142,967	190,594	53,622	7,103	129,869
Employer	893,082	581,284	20,300	291,498	785,260	518,492	9,152	257,616
Recommendations and references	154,942	14,181	13,723	126,038	126,352	5,233	7,149	113,970
Police record	264,594	66,292	13,866	184,436	234,786	55,400	7,290	172,096
Security or other investigative reports	187,762	37,923	8,549	141,290	156,555	18,885	7,700	129,970
Involvement in civil or criminal court action	276,783	85,875	14,303	176,605	225,580	55,775	7,766	162,039
Medical history	342,018	76,760	46,461	218,796	276,344	63,009	16,411	197,423
Dental history	183,882	57,830	34,273	91,780	142,710	44,489	13,620	84,601
Psychiatric history	279,636	68,577	36,210	174,848	226,799	54,816	15,578	156,406
Personality inventory	159,920	54,438	35,366	70,116	119,237	40,849	15,128	63,260
Alcoholism or drug addiction	916,416	64,353	36,313	95,750	154,631	50,848	15,821	87,962
Food purchases and consumption	35,563	0	1,328	34,235	34,800	0	600	34,200
Consumer preferences	34,963	2	651	34,310	34,802	2	600	34,200

PL 360 Righting 90% Of Bugs It Finds

(continued from page 3)

is the language suited for the machine?" as being less significant than, "How well is the computer suited for this kind of language?"

Simple, Simpler, Simplest

In dealing with the programming of the 360, Wirth felt that many operations could be replaced quite simply by much simpler ones. For instance, once an item had been described as being a double length word, then any "load instruction" should be able to realize this fact, and act accordingly. His language, called PL360, is made up of declarations, followed by simple statements.

An add instruction in PL360 is written as the standard name of the register, the operator (plus or minus, etc.), and the value or expression concerned. Statements that read like "EXP := EXP + 251" are standard. Alternatively, in a series of comparisons, the statements read "If X = 10L, then . . ."

90% of Programming Errors Found

During the development of the assembler a supervisor program was undertaken in parallel. Performance figures reflected compiler operation under a particular supervisor and showed that loading of the compiler from the tape and the compiled program took somewhere between four and five seconds. Compilation proceeded at 1000 cards per minute and the compiler recompiled itself in 39 seconds. The entire program took 16K.

The automatic correction system used in the assembler simply enters a search of possible type errors – their probable corrections are held in memory. A search is entered when an incorrect statement (from a logical viewpoint) is found. According to Wirth, this method has caught and corrected 90% of programmer errors.

Draft Resistors-Better Employees?

(continued from page 1)

year, when the draft law revisions were under consideration, James Reston reported in the New York Times that government officials believed 25% of the undergraduate students would refuse to fight in Viet Nam. The Resistance, a nationwide organization, has collected 2500 draft cards since Oct. 16, 1967. They say they expect to collect many more at nationwide demonstrations in April, and expect 10,000 students to refuse induction this summer. This represents between 5% and 15% of the number of people who will be drafted this summer.

It is not clear to what extent EDP students will join the resistance – but ironically a resistor is not necessarily a bad employee. When someone refuses induction, the legal proceedings often take six months to a year, which means that someone who refuses induction can continue working longer than if he went into the army!

Computer Stocks: Trading Summary

Week Ending February 16, 1968

NEW YORK STOCK EXCHANGE	1967 High	1967 Low	Week High	Week Low	Last	Week Net Change	Week %Change
Addressograph-Multigraph	80 1/2	46 7/8	64	58 5/8	62 3/8	+ 3 7/8	+ 6.62
American Research	195	37 3/4	142 1/2	124 3/4	137 7/8	+12	+ 9.57
Ampex Corp.	40 3/4	22 3/4	30 3/4	27 7/8	29 3/4	- 1/4	- 0.83
Burroughs	198 5/8	80 7/8	186	170	177 1/2	+ 5 5/8	+ 3.27
Collins Radio	114 7/8	*53	71 5/8	65 1/8	70	+ 1 1/4	+ 1.82
Control Data	165 5/8	33 1/2	125 7/8	115	118 1/4	- 1/2	- 0.42
Electronic Associates	30 1/4	16 3/4	24 1/2	18 7/8	22 1/2	+ 3 5/8	+19.21
General Electric	115 7/8	82 1/2	88 3/8	86 1/2	87 3/4	. . . .	. . .
Honeywell	117 7/8	64 1/2	96 1/2	89 1/2	94 3/4	+ 3 1/2	+ 3.84
IBM	648	362 1/2	592 1/2	570	577	+ 6	+ 1.05
Litton	120 3/8	67 1/8	72 1/4	68 3/4	69	. . . .	. . .
Nat Cash Register	136 5/8	67 1/8	107 1/4	102 1/4	106 1/2	+ 2 1/4	+ 2.16
RCA	65 1/2	42 5/8	49 1/8	46 7/8	48 5/8	+ 1 1/4	+ 2.64
Raytheon	117	49	87 1/2	80 5/8	81 7/8	+ 2 1/4	+ 2.83
Sanders	77 1/4	37 5/8	51	45 1/8	49 7/8	+ 3 3/4	+ 8.13
Scientific Data	152 3/4	70 3/8	130	116 1/2	128	+11	+ 9.40
SCM	82 1/4	43 1/2	47 5/8	44 1/2	46 1/4	+ 2 3/8	+ 5.41
Sperry Rand	65 1/8	28 1/8	52	47 3/8	48 1/4	+ 1	+ 2.12
NYSE COMPUTER STOCK AVERAGE						+ 3.56	+ 4.27

AMERICAN STOCK EXCHANGE	1967 High	1967 Low	Week High	Week Low	Last	Week Net Change	Week %Change
Audio Devices, Inc.	33 1/8	20	27 5/8	25 1/4	27 1/8	+ 1 1/4	+ 4.83
Automatic Data Processing	68 1/2	41 1/2	50 3/4	44 1/4	50	+ 2	+ 4.17
Bunker Ramo	21 7/8	7 1/2	15 1/8	13 7/8	14 1/8	+ 1/2	+ 3.67
Calcomp	46 3/4	32 1/8	37 3/8	32 1/8	34 1/2	- 1/8	- 0.36
Computer Applications	47 3/8	14	27 3/4	23	26	- 1/4	- 0.95
Computer Sciences	67 5/8	18	48 3/4	42 7/8	44 3/8	+ 1 1/4	+ 2.86
Digital Equipment Corp.	156	29 3/8	114 1/4	99 1/4	113	+14 1/4	+14.43
GC Computer Corp.	41	23 1/4	32	29 1/8	30 5/8	+ 1 1/4	+ 4.26
Leasco	146 1/4	33 5/8	118	103	111 1/4	+ 8 1/4	+ 8.01
Levin-Townsend Computer Corp.	77	10 7/8	55 5/8	48	51 3/4	. . . .	. . .
Milgo Electronics	23 1/8	5 1/8	18	15	16 1/2	+ 1/8	+ 0.76
Mohawk Data Sciences	198 1/2	108	123 1/2	108 1/4	117	+ 9	+ 8.33
Planning Research	51	27 5/8	35 1/2	31	33 7/8	+ 3	+ 9.72
Potter Instrument	40 1/2	12 3/8	28 3/4	25 1/8	27	- 1/2	- 1.82
Randolph Computer Corp.	55 3/4	32 1/4	44 3/8	38	41 1/4	+ 1/2	+ 1.23
AMEX COMPUTER STOCK AVERAGE						+ 2.70	+ 3.94

OVER-THE-COUNTER	1967 High Bid	1967 Low Bid	Friday Bid	Friday Asked	Last Friday Bid	Week Net Change Bid	Week% Change Bid
Applied Data Research	30	3 1/8	24	26	25	- 1	- 4.00
Bolt, Beranek & Newman, Inc.	30	8 1/4	19 3/4	20 3/4	20	- 1/4	- 1.25
Computer Usage	72	20 1/4	42	44	45	- 3	- 6.67
Cyber-Tronics	19	4 3/4	13 3/4	14 1/4	14	- 1/4	- 1.64
Data Products	23 3/8	2 1/2	16	16 1/2	14 3/4	+ 1 1/4	+ 8.48
Digitronics	27 1/2	6	18 3/4	19 1/2	16 1/2	+ 2 1/4	+13.64
DPA, Inc.	17 3/8	4 1/4	12 3/4	13 1/4	12 7/8	- 1/8	- 0.97
Electronic Memories	57 1/2	12 3/4	47 1/2	41 1/2	42	+ 5 1/2	+13.10
Fabri-Tek	15 3/4	6	10	10 1/2	9 1/2	+ 1/2	+ 5.27
Informatics	59 1/2	7 1/2	40 1/2	42	41	- 1/2	- 1.22
LMC Data, Inc.	16	7 3/8	11 1/4	12	11 1/2	- 1/4	- 2.17
Management Assistance	24 3/8	10 1/8	11 3/4	12 1/8	12 1/4	- 1/2	- 4.08
Memorex	66 1/2	59	63	65	59	+ 4	+ 6.78
Optical Scanning Corp.	102	25 3/4	84	87	81	+ 3	+ 3.70
Recognition Equipment Corp.	198	48 1/2	160	165	149	+11	+ 7.38
Systems Engineering Labs	63 1/4	8 7/8	49	51	48	+ 1	+ 2.08
University Computing Co.	95	65	66	68	66	. . . .	. . .

DDP-324 Multiprocessor System Introduced

FRAMINGHAM, MASS. – Honeywell's Computer Control Division has introduced a general purpose dual processor computer with common-storage which is said to perform more than 500,000 operations a second.

The company announced that three of the new integrated circuit computers have been ordered by Conductron Missouri, a division of Conductron Corp., for use in trainers simulating the Boeing 747 superjet. The St. Charles, Mo., company is building the simulators for Boeing, Pan American, and Lufthansa Airlines.

Deliveries of the computers, valued at over $750,000, will start immediately. The large capacity computers will allow pilots to begin flight training for the 747 before the first aircraft is delivered. Any changes or additions made to the flight characteristics of the actual 747 can also be included in the trainer.

The DDP-324 is suitable for today's generation of simulators and also has the growth capacity needed for the era of the C5A, 747 and SST, Conductron said.

The company said they estimate that computing equipment provides at least 20% excess capacity in memory, discrete and analog input and output, synchro output, and program execution time.

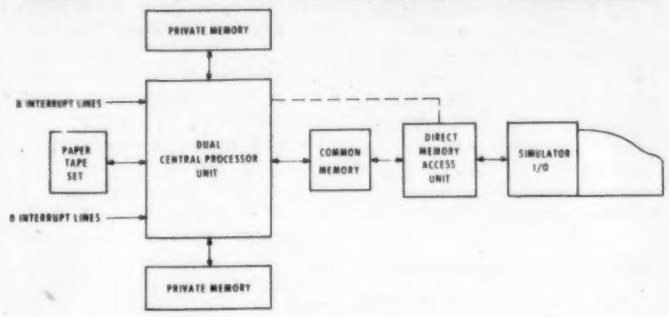
It's a long time before the super-jets will be flying – or even before the exact designs are completed. Yet pilots' experience is needed NOW – and the simulators which the pilots must "fly" must have the ability to simulate the huge machines in real-time – and take into account whatever design-changes will occur in the future. A fast general-purpose computer can do the job – and here is the console of one of the new dual processor DDP-324s which have got the job.

Fast Machine

The basic dual processor with 24K memory, is priced at $165,000, which the company claims to be 16% below comparable machines and it has 60% faster speeds.

The DDP-324 has two processing units (effectively DDP 124 systems), each with 8192 words of private memory and 8192 words of shared memory. Word length is 24 bits. Each private memory may be expanded up to 24,576 words. Shared memory may be used for common data and as a communications link between the processors and input/output devices.

No specialized software for the multiprocessor system is planned at present. Either processor can use the standard DDP-124 software which currently consists of 380 field tested programs that are completely compatible with DDP-224, -124 and -24 computers. Included are Fortran IV compiler, compatible symbolic assembler, systems I/O, math, test, and utility programs.



DDP-324
COMPUTER SYSTEM BLOCK DIAGRAM

Beware Of Software Firms With 500 Staff!

NEW YORK, N.Y. – During the next five years, there may be a significant shift in the distribution of computers by size. The value of installed medium-scale machines – those with monthly rentals in the $5000 to $20,000 range – might well decrease from the present 51% of the total value of computers installed to just under 28% by 1972. The distribution of large computers (renting at over $20,000 a month) would increase from the present 32% to over 48% in 1972.

These estimates, based on the increasing use of small computers and the growing trend toward terminals on-line with giant computers, were given during a one-day briefing session for investment analysts conducted here by *EDP Industry Report*, the semi-monthly newsletter published by the International Data Corporation for executives concerned with the electronic data processing industry.

Growth Problems in Software

In an examination of software suppliers, IDC Vice President John P. Breyer noted that most successful software firms fall into two distinct categories: Those with less than 100 employees and those with more than 1000 employees. As companies grow, he explained, there is a loss of management contact with the technical employees, and fragmentation is likely. This is particularly true because low capital requirements make it relatively easy for personnel to spin off and develop a new software company. Companies which reach a large size usually do so through acquisitions, and are quite widely diversified into such activities as service bureaus and/or education services.

At the same time it was pointed out that the market for independent companies has been relatively small, representing only $180 million of an estimated $5 billion spent on software during 1967. The market for independent software suppliers, however, is estimated to grow to about $1 billion out of the $11 billion that will be spent on software by 1972. The independents are expected to be strongest in supplying proprietary packages and specialized applications software.

Third-Party Leasing Question

The future for computer leasing companies, IDC Vice President Max Eveleth told the analysts, is not clear cut. The big question facing leasing companies, Eveleth noted, is that of marketing equipment that has been turned in by current users. When a leasing company first signs up a customer, the customer usually has worked with the computer manufacturer in selecting his system and takes the lease simply to save money. When the leasing company goes to place its equipment a second time, however, it must assist the potential customer with equipment selection, support, software, and education – techniques far different from straight financing.

Growing Terminal Market

One big trend pointed out in the briefing session is that toward a rapidly expanding market for the independent peripheral manufacturer, especially for on-line terminal equipment. Remote terminals accounted for about 6% of the value of computer equipment shipped in 1967, or approximately $350 million.